



# COMBIVERT G6

HIGH PERFORMANCE INVERTER 0.75 ... 30 kW

EN



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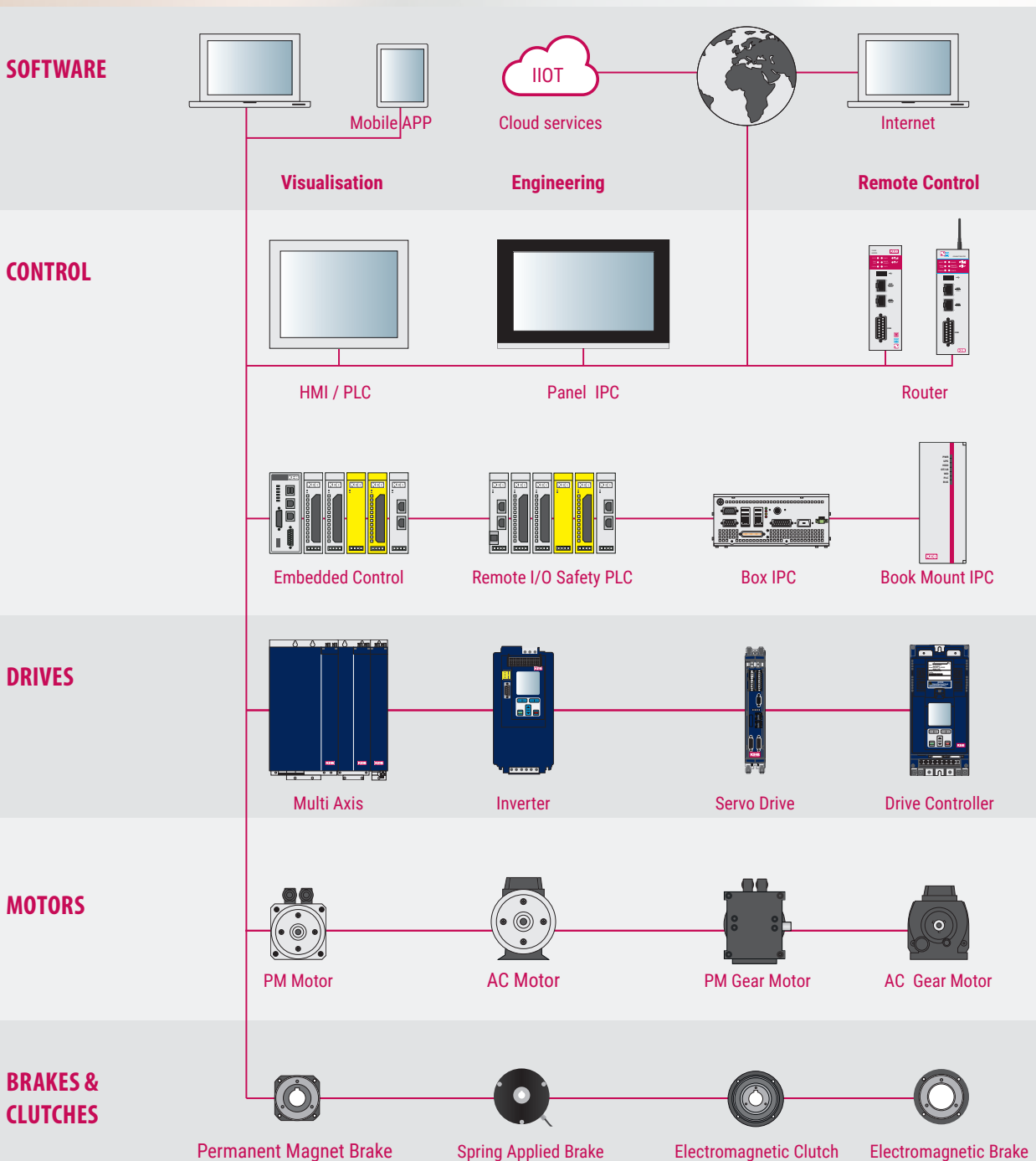
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# SYSTEM OVERVIEW

## Automation with Drive

stands as a synonym for optimally selected combinations of control and automation solutions with the drive level at the end it is the key to successful machine concepts.

Let the following pages inspire you with regards to the diversity and performance of the COMBIVERT G6 drive controller, and help you to find a solution that reliably meets your requirements.



## COMBIVERT G6 - HIGH PERFORMANCE INVERTER



The COMBIVERT G6 series was designed as an solution which covers all important requirements for open loop three-phase drives within one device. Therefore a high degree of variability, supporting actual and future technologies, is prepared.

Equipped with new 32-bit microcontrollers, proven features of previous KEB frequency inverters have been specifically enhanced and further developed in the devices.

- The basic version of the operating v/Hz - and the **SMM**-control method (**S**ensorless **M**otor **M**anagement) uses conventional tasks with asynchronous drives for output frequencies up to 599 Hz, optional up to 800 Hz.

Highest demands on torque and speed stability meet the versions with sensorless control operation

- **G6-ASCL** (asynchronous-sensorless control) for asynchronous motors and
- **G6-SCL** (synchronous-sensorless control) synchronous motors

The two level parameter structure with basic (customer parameters) and application menu (application parameters) gives COMBIVERT G6 a unique user friendly and easy handling high functionality. The integrated multi-language LCD plain text display eased the operator guidance.

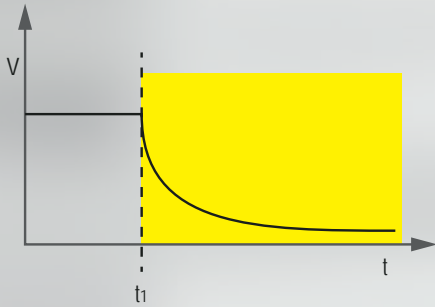
Demand-driven fan and stand-by mode reduce equipment losses / heat stress in the switching cabinet, ultimately increasing the overall efficiency of the system.

For a simplified maintenance, the fans are easily replaceable. The compact design for "side by side" reduces the space required for multi-axis to a minimum.

COMBIVERT G6 - the new reference point for industrial applications in machine and plant construction.

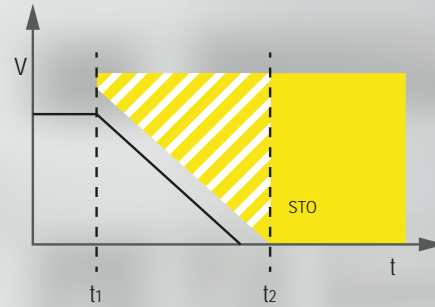
Conforming to the actual requirements of the European machine directive, the COMBIVERT G6 offers an integrated 2-channel safety function STO according to category 3, EN ISO 13849-1 PL e / IEC EN 62061, SIL 3.

**STO**



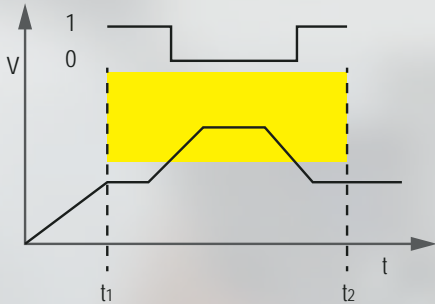
Safe Torque OFF

**SS1**



Safe Stop 1

**SSM**



Safe Speed Monitor (f = 0 Hz)

Additionally the function SS1 can be covered together with an external safety timing relay. The drive is decelerated within a fixed time and is set to STO (stop category 1, EN 60204-1).

**COMBIVERT G6 - ON BOARD - EMC TECHNOLOGY**

All sizes are equipped with an internal EMC filter ready for the installation, whose special property are the minimum leakage current against earth and motor cable lengths up to 100 m.

**COMBIVERT G6 - FOR SERIAL COMMUNICATION**

Flexible connection to the control level meets COMBIVERT G6 with ON-BOARD-fieldbus-options for

**EtherCAT**  
 CAN over EtherCAT DS 402  
 100 MBaud  
 (without LCD-Display)

**CANopen**  
 CAN-Slave  
 Profil DS 402  
 (with / without LCD-Display)

optional solutions

**IO-Link**

# PROPERTIES / FUNCTIONS - CONTROL UNIT

## DIGITAL INPUTS AND OUTPUTS

- 8 Digital In
- 2 Relays
- 2 Digital Out
- Pulse-Train (CAN)

## UNIVERSAL ANALOG INPUT / OUTPUTS

- 2 Analog In, 0 ...  $\pm 10$  V, 0 ...  $\pm 20$  mA, 4 ... 20 mA
- 2 Analog Out (0 ...  $\pm 10$  V) (not available for EtherCAT)

## SAFETY FUNCTION

- STO -function, 2-channel according category 3, EN ISO 13849-1 PL e, IEC EN 62061, SIL3
- Devices with EtherCAT - and IO-Link control fulfill optional, the TÜV-certified function SSM with level 0 Hz

## CONTROL UNIT

- internal and external 24 V DC supply
- RS 232/485-interface, open protocol KEB DIN 66019-II

## DC-BRAKING

- Special stopping without brake resistor

## BRAKE CONTROL

- Safe operation of brake and sliding-rotor motors

## PID-CONTROLLERS

- Process controllers for internal and external variables

## OEM - USER GUIDE

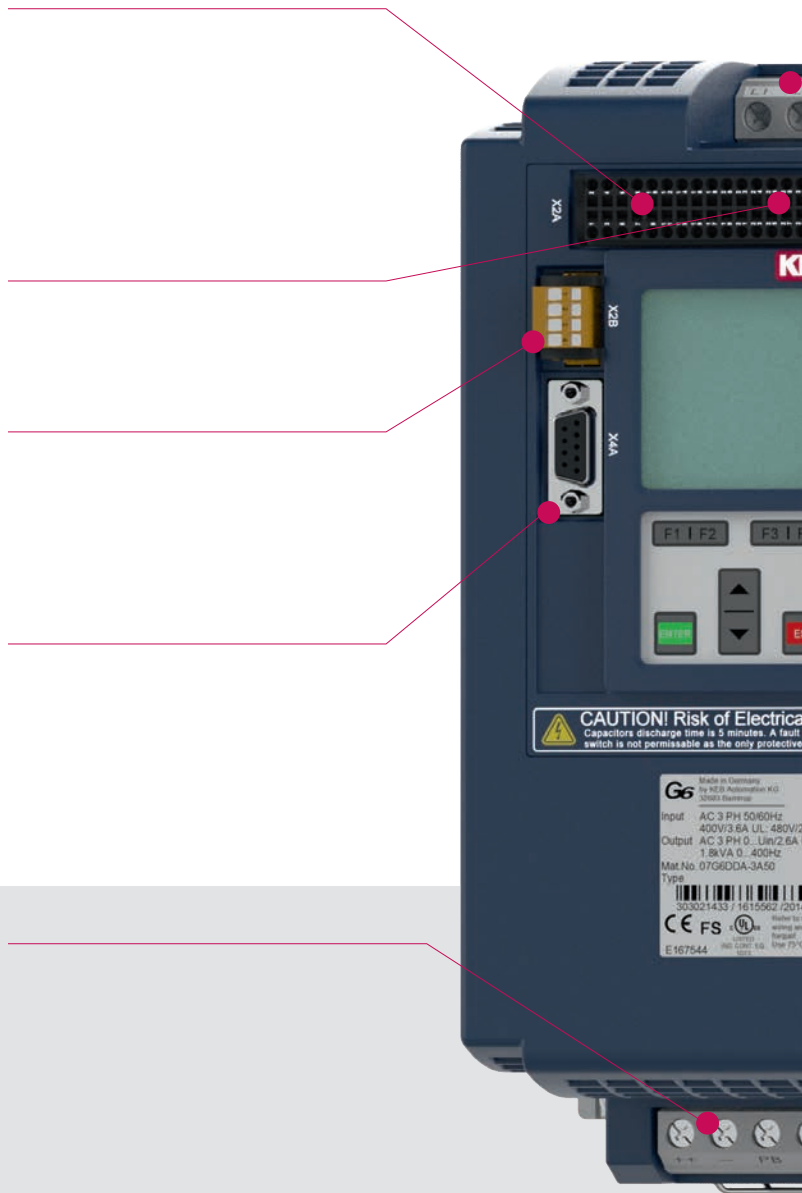
- For direct use in series equipment, **KEB** offers the option of delivering devices ex works, which are fully preset and protected against unauthorised access with a password

## QUICK INPUT / OUTPUT SCANNING

- For the 32-pole control terminal strip for dynamic start-stop applications with high and repetitious accuracy

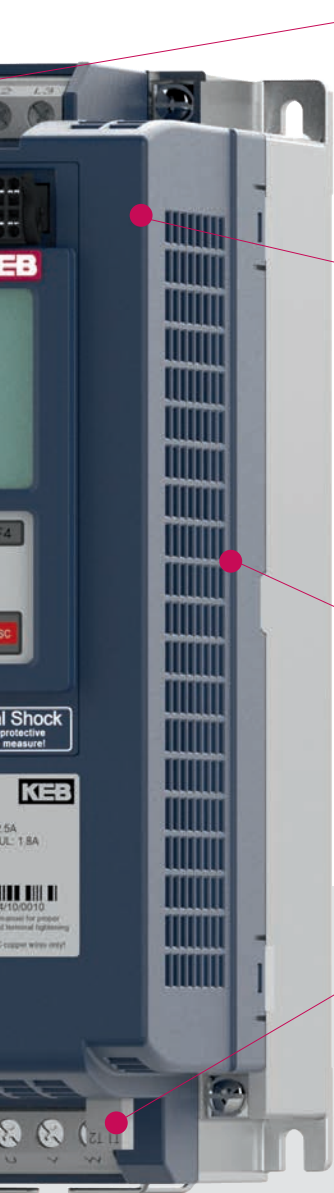
## 8 PARAMETER SETS

- Complete set programming offers extensive functionality for I/O handling tasks or sequential operation of multiple motors, and can also partially take over otherwise superordinated PLC tasks



EtherCAT

CANopen



COMBIVERT G6  
Safety-version with display

### POWER STAGE

- 1 ph. 200 ... 240 V AC, 3-ph.
- 380 ... 480 V AC, +10/-20%, 50/60 Hz and DC-input
- EMC according to class C1 and C2 with integrated filter  
Internal braking transistor (GTR7)

### INTEGRATED EMC SOLUTION

built with new innovative core materials and configured

- according to EN61800-3 for environments C1 and C2  
sized for motor cables, up to 100 m - C2 / 50 m - C1
- for especially low leakage currents of the filter component towards the ground

and installation-safe due to consistently separated mains and motor connection side.

### FULLY DIMENSIONED

- With high overload characteristic for acceleration and deceleration, primarily configured for load profiles with constant torque.
- True intermediate circuit capacity for absorbing pulse energy and robust behaviour against fluctuations of net.

### THERMO CONTACT EVALUATION

- Flexibly adjustable analysis of thermal signals of connected motors (PTC and thermo switches) for advanced warning or direct safety shut-down.

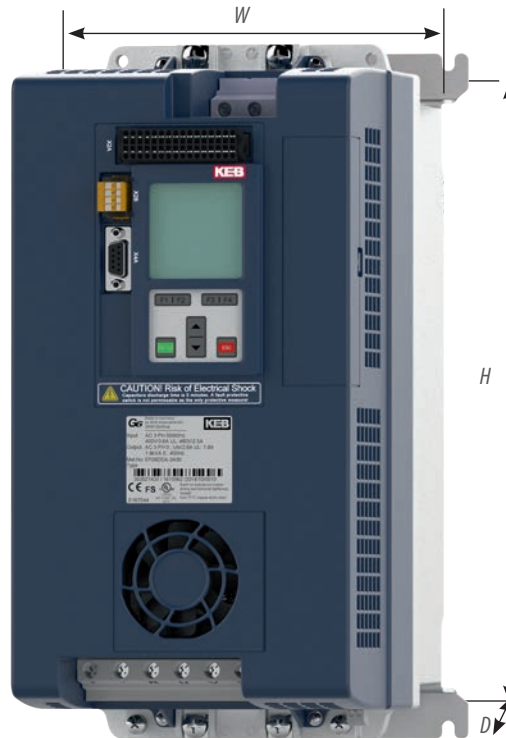
open®



### PREPARED FOR WORLDWIDE USE

- Approbation UL/cUL
- Configured for mains input voltages from 200 V to 240 V, or 380 V to max. 480 V, 50/60 Hz, tolerance +10/-20%
- DC-supply with precharging in series (housing A ... C)
- Protective coating of the circuit boards

## DATA TABLE - MECHANICS



COMBIVERT G6  
housing E - Flat Rear

Available in 4 different mechanical sizes, COMBIVERT G6 are covering the power range from 0.75 kW to 30 kW designed for cabinet or machine frame installation.

Devices with Flat Rear and the push-through mounting are size depending variations to optimize the heat transfer.

INSTALLATION SIZE			A	B	C	E
Width	<b>B</b>	[mm]	90	90	117	170/198*
Height	<b>H</b>	[mm]	204	269	260	340
Depth	<b>T</b>	[mm]	200	200	230/175*	280/165*
Mounting			2 x M4	2 x M4	4 x M5	4 x M6 / 10 x M6*
Weight		[kg]	1.5	2.5	4.6/4.5*	11.3
Cooling						
Ventilated convection			✓	✓	✓	✓
Flat Rear* heat transfer			✓	✓	option	option
External heat/push-through			—	—	—	✓



	<b>230 V</b>		<b>400 V</b>												
Size	07	09	07	09	10	12	13	13	14	15	16	17	18	19	
Input rating $U_N$	[V]	230 V	400 / 480 V*												
Mains phases		1	3												
Mains frequency	[Hz]	50/60 ± 2 %	50/60 ± 2 %												
Housing size		A	A			B		C			E				
Output power rating	[kVA]	1.6	2.8	1.8	2.8	4	6.6	8.3	8.3	11	17	23	29	35	42
<b>Max. motor power rating</b>	<b>[kW]</b>	<b>0.75</b>	<b>1.5</b>	<b>0.75</b>	<b>1.5</b>	<b>2.2</b>	<b>4</b>	<b>5.5</b>	<b>5.5</b>	<b>7.5</b>	<b>11</b>	<b>15</b>	<b>18.5</b>	<b>22</b>	<b>30</b>
Output rated current *	[A]	4	7	2.6	4.1	5.8	9.5	12	12	16.5	24	33	42	50	60
Max. short-time limit current (60 sec.)	[A]	7.2	12.6	4.7	7.2	10.4	17.1	21.6	21.6	29.7	36	49.5	63	75	90
OC-release current	[A]	8.6	15.1	5.6	8.9	12.5	20.6	25.9	25.9	35.6	43.2	59	75	90	108
Input rated current	[A]	8	14	3.6	6	8	13	17	17	23	31	43	55	65	66
Max. admissible mains fuse (gG)	[A]	20	20	16	16	16	20	25	25	25	35	50	63	80	80
Rated switching frequency	[kHz]	4	4	8	4	4	4	4	8	4	4	4	4	4	4
Max. switching frequency	[kHz]	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Power loss at nominal operation approx.	[W]	90	100	40	50	65	92	124	210	220	285	448	569	687	762
Input voltage range $U_{in}$	[V]	180 ... 264 ± 0%	380 ... 480 (305 ... 528 ± 0%)												
Network configurations		TN, TT	TN, TT, IT												
Output voltage	[V]	3 x 0 ... $U_{in}$													
Output frequency	[Hz]	0 ... 400 (fs = 4 kHz) / 0 ... 599 (fs = 8 kHz) optional 800													
Max. Motor cable length (screened EN 61800-3)															
Limit class C1 (low-capacity/standard line)	[m]	30	50 / 25												
Limit class C2 (low-capacity/standard line)	[m]	50	100 / 50												
Protection type	[EN60529]	IP 20 / VBG4													
Operating temperature	[°C]	-10 ... 45 (55 with derating)													
Storage temperature	[°C]	-25 ... 70													
Climate category in operation	[EN 60721-3-3]	3K3													
Environment	[IEC 664-1]	rate of pollution 2													
Vibration		railway EN 50155, German. Lloyd Part 7-3													
Internal braking transistor GTR7		✓													
Intermediate circuit connection		✓													
Motor PTC-evaluation		✓													

\* Rated Voltage 480 V:  $I_{nom} = 0.86 \times \text{output rated current}$



## APPLICATIONS MASCHINE BUILDING AND PLANT CONSTRUCTIONS

### FOOD PRODUCTION

- High breakaway torque during start-up
- Exact torque during process
- Protective coating

### PACKAGING TECHNOLOGY

- Fast set value processing with  $\pm 10$  V
- Controlled positioning compensates dead times

### CONVEYOR AND STORAGE TECHNOLOGY

- Long motor lines up to 100 m
- Robust mechanics

### CRANES, LIFTING DEVICES

- High dynamics during acceleration
- Internal braking transistor

### COMPRESSORS

- Output frequency up to 599 (800) Hz
- PID controllers for process control

### ELEVATORS

- High starting torque
- Consistent torque with change of loads
- Suitable for modern three-phase motors and conventional elevator motors

### WOOD MACHINING EQUIPMENT

- Operation of spindle drives
- Conveyor systems, stacker
- Tool adjustment

### TEXTILE EQUIPMENT

- PID controllers for process control
- Protective coating

### ESCALATORS

- Energy savings in stand-by mode
- High starting torque, constant speed

### MEDICAL TECHNOLOGY

- Flexible fieldbus interfaces



**KEB**



#### **IN ADDITION, COMBIVERT G6 CAN ALSO BE ADAPTED TO CUSTOMER-SPECIFIC APPLICATIONS**

- The existing platform has been prepared for additional variations, e.g.
  - special fieldbus protocols,
  - operation of special motors
- or
  - the expansion of software functions

## COMBIVIS 6

- Free and easy-to-use software for startup, administration and analysis
- Integrated start-up assistants (Wizards) for quick and easy configuration
- Direct access to device documentation
- 16 channel oscilloscope for extensive analysis
- Online parameter list comparison
- Parameterization of key safety indicators and functions



## COMBIVIS studio 6 – THE ENGINEERING TOOL FOR AUTOMATION SOLUTIONS

The intelligent automation suite from KEB combines an assistant-guided component selection, fieldbus configuration, drive parameterization, IEC 61131-3 project generation and motion control. Throughout the planning and layout phase, implementation of control sequences and multi axis movement profiles, to start-up and fine tuning, the user is supported by a tool developed by experienced application engineers.

With a foundation built on libraries, devices and template databases, rapid and simple solutions can be generated for a wide range of applications.

**COMMISSIONING ASSISTANT**

- Complete user guidance through the commissioning process
- KEB Motor database, free for extensions
- Anti cogging
- Fieldbus diagnostic and optimization

**SYSTEM CONFIGURATION AS A NEW COMPONENT OF COMBIVIS**

- Access to complete KEB product database
- Intuitive gear component selection and system configuration using drag and drop
- Selection assistant with display of compatible components
- Display of all interfaces and connection components
- Material number generator
- Extensive export function for quote list, Combivis Project, Excel ...



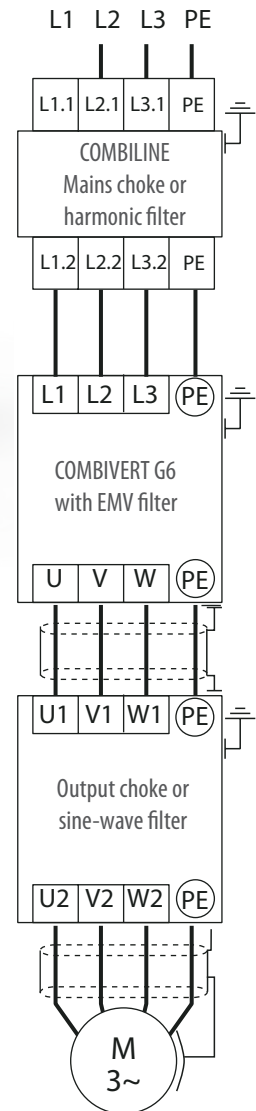
**HIGHLIGHTS**

- Start-up and diagnosis assistant
- Document database
- Product configuration
- Device and library database

# ACCESSORIES

## STABLE OPERATION IN INDUSTRIAL ENVIRONMENT

An EMC-compliant assembly with efficient control cabinet and suppression system is the basis for safe operation of machinery and equipment. The current and voltage limiting COMBILINE modules for mains and motor side are designed to meet the requirements of the COMBIVERT G6 drive controller series.



### MAINS CHOKE

Reduce the input peak current draw and the mains distortion. By smoothing the input current draw, the lifetime of the drive is enhanced, in particular at constantly high utilization.

### OUTPUT CHOKES AND FILTERS

reduce the voltage and current stress of the motor winding.

### SINE-WAVE FILTERS

Protect the motor winding from voltage peaks and allow the use of long motor cables.

### HARMONIC FILTERS

reduce the low frequency mains distortion of B6-rectifier supplied devices. These harmonic filters are the new innovative solution to comply to most international standards. The integration to a switch gear layout is as simple as of mains chokes.

### HIGH PERFORMANCE FERRITE CORES

reduces the values of  $du/dt$ 's also in the frequency range of the bearing currents.

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